

by many leading men of science. The Royal Society, of which Sir Michael Foster was a secretary for twenty-two years, was represented by Lord Rayleigh, O.M., president; Prof. D. Ferrier, vice-president; Sir Archibald Geikie, secretary; Mr. R. Harrison, assistant secretary; and a large number of fellows of the society. Among those present were Lord Reay (president of the British Academy), Lord Monckswell, Sir William Crookes, Sir Philip Magnus, M.P., Sir Arthur Rücker (principal of the University of London) and Lady Rücker, Sir Norman and Lady Lockyer (British Science Guild), Major MacMahon (British Association), Sir William Ramsay, Sir Joseph Swan, Sir J. Crichton-Browne, Sir James Blyth, Prof. R. Meldola (president of the Chemical Society), Dr. Russell Wells, Prof. S. P. Thompson, Dr. E. Divers, Dr. J. Kingston Fowler (dean of the faculty of medicine at the University of London), Prof. Wyndham Dunstan, Prof. Tilden, Prof. Priebisch, Sir Alexander Pedler, Dr. Bashford, Prof. Thane, Prof. Starling, Dr. Hugo Müller, Prof. Emerson Reynolds, Sir Henry Howorth, Prof. McLeod, Sir H. Trueman Wood, Dr. Horace Brown, Prof. Judd, Prof. Hull, and Mr. Frederick Macmillan.

A large and representative congregation also attended the memorial service held in Trinity College Chapel, Cambridge, of which college Sir Michael was a fellow. The congregation included the Vice-Chancellor (the Rev. E. S. Roberts, Master of Caius), Profs. Sir R. S. Ball, E. C. Clark, T. Clifford Allbutt, A. Macalister, A. R. Forsyth, Carey Foster, F. Howard Marsh, G. Sims Woodhead, H. Jackson, and A. C. Seward, Dr. W. N. Shaw, and the following representatives of learned societies:—University of Oxford, Prof. Poulton, Dr. Collier, Prof. Gotch; the Royal Society, Mr. A. B. Kempe (treasurer), Mr. F. Darwin (foreign secretary), and other councillors; University College, London, Prof. H. S. Foxwell; British Association, Sir George Darwin and Mr. A. E. Shipley; Cambridge Philosophical Society, Dr. Hobson (president) and Mr. H. F. Newall (treasurer); the Epidemiological Society of London, Dr. H. Timbrell Bulstrode; Manchester University, Prof. Lamb and Prof. Conway.

NOTES.

At the forthcoming meeting of the British Association in Leicester, the evening lectures will be by Mr. W. Duddell, on "The Arc and the Spark in Radio-telegraphy," and by Dr. F. A. Dixey, on "Recent Developments in the Theory of Mimicry." The lecture to the operative classes will be given by Prof. H. A. Miers, F.R.S., on "The Growth of a Crystal."

WE notice with deep regret that Prof. D. I. Mendeléeff, the eminent Russian chemist, who was born seventy-three years ago to-day, died on February 2. Prof. Mendeléeff was the subject of a "Scientific Worthy" article in NATURE of June 27, 1889 (vol. xl., p. 193), and we hope to supplement this next week with a short account of work accomplished by him since that date.

WE learn from the *British Medical Journal* that the seventh International Congress of Physiology will be held this year at Heidelberg on August 13–16, under the presidency of Prof. August Kossel. In connection with the congress there will be an exhibition of scientific apparatus. Announcements of communications should be sent to the Physiological Institute, Heidelberg, before June 15.

A REUTER message from Melbourne on January 31 reports that slight shocks of earthquake have occurred at Eden, New South Wales, and at Gabo Island, off the coast of Victoria. Severe shocks were felt in north-eastern Tasmania on January 30. News has reached Melbourne that two severe and prolonged shocks were felt in the Tonga Islands on January 2.

Science announces that Dr. Otto Lummer, professor of experimental physics at Breslau, will begin a course of ten lectures at Columbia University on February 15. Prof. J. Larmor, Sec.R.S., will begin a course of six lectures on March 27. Mr. W. Bateson, F.R.S., will give the Silliman memorial lectures at Yale University next year. The preceding lecturers on this foundation have been Prof. J. J. Thomson, F.R.S., Prof. C. S. Sherrington, F.R.S., Prof. Ernest Rutherford, F.R.S., and Prof. W. Nernst.

ON Tuesday next, February 12, Prof. W. Stirling will begin a course of six lectures at the Royal Institution on "The Visual Apparatus of Man and Animals"; on Thursday, February 14, Mr. A. Harker will give the first of two lectures on "The Minute Structures of Igneous Rocks and their Significance"; and on Saturday, February 16, Prof. J. J. Thomson will commence a course of six lectures on "Röntgen, Kathode, and Positive Rays." The Friday evening discourse on February 15 will be by Mr. J. J. Lister, on "Foraminifera."

A COMMITTEE has been appointed by the Board of Treasury to inquire generally into the work now performed at the National Physical Laboratory, with special reference to the character of the tests undertaken there and the lines on which any further development of the work of the laboratory should proceed. The committee consists of Mr. G. W. Balfour, chairman, Sir Andrew Noble, Bart., K.C.B., F.R.S., Sir J. Wolfe Barry, K.C.B., F.R.S., Mr. W. J. Crossley, M.P., and Mr. R. Chalmers, C.B. Mr. G. C. Upcott, of the Treasury, will act as secretary to the committee.

UPON the authority of the *Figaro*, the Paris correspondent of the *Times* reports that M. Daniel Osiris has left by his will a sum of one million sterling to the Pasteur Institute. The bequest by which the Pasteur Institute thus benefits will provide it with an annual income of from 30,000*l.* to 40,000*l.* It is already one of the best endowed scientific institutions in the world, and this princely gift will enable it to organise on a practical basis a large number of new branch establishments for scientific research all over France and in the French colonies.

COLONEL JOHN MERCER BROOKE, whose death in his eightieth year was recently announced, was best known as the inventor of a deep-sea sounding apparatus which was subsequently superseded by that of Lord Kelvin. During the American Civil War, Colonel Brooke, along with Maury, the distinguished hydrographer, associated himself with the seceding States, and was successful in effecting many improvements in the cannon of the time. At the close of the war he was appointed a professor in the Virginia Military Institute at Lexington, and held the chair of physics and astronomy until 1899. In the years preceding the Civil War, he was engaged in making hydrographic surveys in the Pacific Ocean, particularly in the archipelago and along the coasts of China and Japan.

A RECENT Reuter message from Entebbe shows that the new Commissioner of Uganda is making vigorous efforts to combat the scourge of sleeping sickness. Acting upon the discoveries made by the Royal Society's commission with regard to the transmission of the disease by the local species of tsetse-fly, it is sought to render the fly innocuous by preventing it from becoming infected with the micro-organism (*Trypanosoma*) which causes the disease. With this end in view the natives are being removed from the

lake shore, the region which is the special haunt of the tsetse-fly in question, while at the lake ports, such as Entebbe and Jinja, every effort is being made to oust the fly by destroying the vegetation which harbours it, and Entebbe is already reported to be clear of fly. It is only to be hoped that the process of deforestation will be carried out with discretion as well as with zeal, and only those tracts denuded of forest which have been definitely proved to harbour the tsetse; a forest tree may be destroyed in half an hour which a hundred years will not replace. The experience of other diseases transmitted by biting insects, such as yellow fever, indicates that the most efficient method of preventing the spread of the disease is to isolate the patients in such a way as to prevent them from infecting the insects which are the carriers. If it is possible to carry this out on so large a scale as the Protectorate Government is trying to do it, we may hope to see in a few years the disease stamped out completely in the territory of Uganda. The Commissioner is to be congratulated on the promptness and energy with which he is turning the conclusions of scientific investigation to practical use.

AN interesting innovation in coal-mining practice is reported from the United States, where at a colliery at Shamokin, Pennsylvania, concrete has been substituted for mine timbering. A plant for the manufacture of these cement props is in course of erection at Trevorton.

ON January 28 coal was struck at Lord Dudley's sinkings at Baggeridge Woods at a depth of 556 yards. The seam is 20 feet thick, and beds of excellent ironstone have also been encountered. The discovery has verified the prediction of geologists regarding the existence of Coal-measures under the sandstone to the west of the South Staffordshire coalfield. This is the first place where coal has been found on the eastern side of the great Western Boundary fault, and the discovery is one of national importance. The work of sinking was commenced nine years ago, and great difficulties had to be contended with in consequence of the large quantities of water encountered.

THE Transvaal Geological Survey has issued a monograph (Memoir No. 3, Pretoria, 1906, price 7s. 6d.), by Mr. E. T. Mellor, on the geology of the Transvaal Coal-measures, with special reference to the Witbank coalfield. It contains a detailed account of the coal resources of the Witbank district, at the present time the most important coalfield in the Transvaal. In addition, the available information regarding the geology of the Coal-measures of the Transvaal in general is ably summarised. Notes on the correlation of the Transvaal Coal-measures, a list of the fossils of the Transvaal Coal-measures, analyses of the coals, statistics of production from 1893 to 1906, and a useful bibliography are appended. The memoir covers sixty pages, and is accompanied by a map, six sections, and fourteen plates reproduced from photographs.

IN the *Engineer* of February 1 there is a copiously illustrated description of the Tehuantepec railway and of the terminal harbours at Salina Cruz, on the Pacific, and Coatzacoalcos, on the Gulf of Mexico, which were formally opened by the President of the Republic of Mexico on January 23. The length of the line is 189 miles, and the opening up of a trade route across the isthmus will be of special benefit to the middle west of the United States. The average saving in distance by the Tehuantepec route over a Panama canal for traffic between Europe or the Atlantic ports of the United States is about 1250 miles.

Proposals to construct a railway across the isthmus were made as long ago as 1842, and a railway was completed by 1894, the Mexican Government having spent on the undertaking 3,500,000l. The railway, however, was not adapted for heavy traffic, and had no terminal facilities or harbour works. In 1898 the Government entered into a contract with the London firm of S. Pearson and Son, Ltd., to reconstruct the line and to provide harbour accommodation. This has now been done at a cost of 9,500,000l., and the railway will undoubtedly prove a formidable competitor to the Panama Canal when that difficult enterprise is completed. For the Panama Canal the Americans have decided on a lock-canal system; but this system cannot, Mr. P. Bunau-Varilla points out in a very important paper contributed to the Society of Arts (Journal, vol. lv., p. 239), be looked forward to with complacency in a volcanic neighbourhood subject to earthquakes. Mr. Bunau-Varilla, who had been connected with the Panama Canal since 1884, proposes a well-considered alternative scheme in which water is used as the carrying power for the machinery to do the excavating and for the transport of the dredged material. In short, the heavy rainfall is not treated as an enemy, but converted into a friend and ally. In this way Mr. Bunau-Varilla claims to have solved the problem set by Charles V. in 1523 to Cortes: Discover the secret of the straits (*el Secreto del Estrecho*). The secret lies in the topography and hydraulics of the isthmus. Everything has been prepared by nature, in the high valley of the Chagres, to lift the earth that obstructs the site of the straits. Harness this power, and the straits will be made by its spontaneous action.

IN a document issued by the Public Works Department, the director of the Zoological Gardens at Giza announces that he has returned from a trip to the Sudan, bringing with him a number of animals, inclusive of a giraffe, three young elephants, and five *ril* gazelles (*Gazella ruficollis*).

HAVING in earlier issues of the same journal discussed the filtering apparatus attached to the gill-rakers of various groups of surface fishes, especially those which feed on plankton, Dr. Enoch Zander in part ii. of vol. lxxxv. of the *Zeitschrift für wissenschaftliche Zoologie* records the results of his investigations in connection with corresponding structures in deep-sea fishes. The general results arrived at in the case of surface-dwelling species hold good in the main for deep-sea fishes, forms living in open water usually having the filtering apparatus much more strongly developed than in the bottom-dwelling types. The large-headed open-water genus *Stomias* is, however, an exception in this respect.

IN the *American Naturalist* for January Mr. E. Linton describes the manner in which the parasitic fish *Fierasfer affinis* effects an entrance into the body of the sea-cucumber, which serves as its host. Although the observations are not entirely new, they are of considerable interest. When the small pellucid fish comes alongside of the holothurian, it gradually feels its way down the body of the latter by means of its head until it reaches the vent, when it immediately curls itself into a loop and thrusts the tip of its whip-like tail into the aperture of the latter. When this is accomplished, the fish straightens its body, and proceeds leisurely to insinuate itself, tail-first, into the body of its host, the action being apparently assisted by the spines of the dorsal and ventral fins. The whole process occupies only about half a minute.

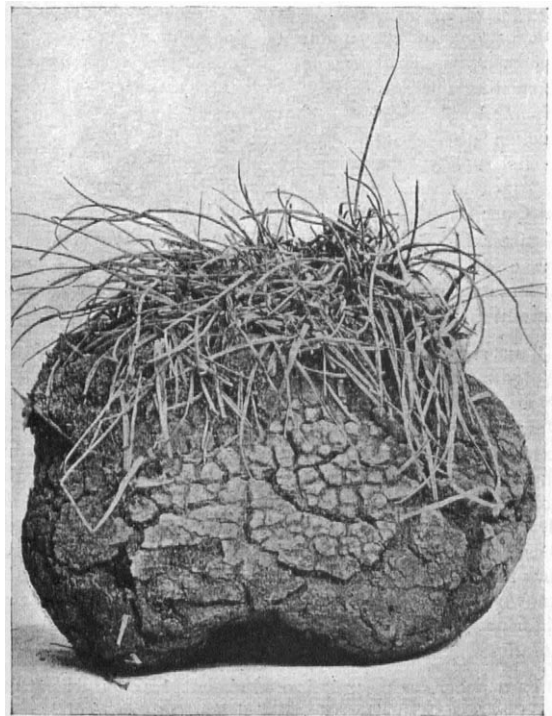
MUCH interest attaches to an account, by Mr. James Murray, in the January number of the *Zoologist*, of a remarkable "encystment" undergone by a British species of so-called "water-bear" (*Macrobiotus*). Certain peculiar little yellow elliptical or sausage-shaped packages, from which, when squeezed, water-bears in a quiescent condition spurted out, were, it appears, first observed. Subsequent investigation proved these to be an early stage of the encystment of these creatures. In the species fully examined there is an outer cyst with six rudimentary legs; inside this is an inner, limbless cyst containing at first a fully developed water-bear. Later on the *Macrobiotus* shrinks to an almost amorphous condition, so that it looks more like a worm. What happens afterwards, and likewise the object of these strange changes, have yet to be ascertained. A similar encystment was detected almost synchronously by Prof. Lauterborn in the case of a Continental species. In the same issue Mr. A. Campbell describes certain naked house-mice similar to a type described in 1856 as *Mus musculus nudoplicatus*. Since, however, this phase is a pathological development, it has obviously no right to a racial name.

THE U.S. Bureau of Entomology has re-issued (Bulletin No. 26) a report, published in 1895, on the San José or Chinese scale-insect (*Aspidiotus perniciosus*) in a revised and expanded form, so as to include an account of the investigations and remedial measures which have been undertaken and suggested since that date. The author of the new publication is Mr. C. L. Marlatt, acting chief of the Bureau. The insect, it seems, first made its appearance in America in the early 'seventies at San José, California, on the estate of the late Mr. James Lick, who was in the habit of importing plants from abroad. It was not, however, until 1901, as the result of a special expedition, that its native home was definitely located in north-eastern China. The isolated condition of this habitat is considered to be the reason that prevented the pest from overrunning a large portion of the world centuries ago. Despite the destruction caused to orchards when it once obtains a footing, the pest is now to a great extent under control, mainly owing to a lime-sulphur wash. In some degree the invasion has, indeed, been a blessing in disguise, since the greater care rendered necessary in selection, planting, and culture has largely benefited fruit-growing in general. At one time great hopes were entertained that a Chinese ladybird would form the most efficient restraining agent, but the use of washes and the presence of a parasite were inimical to the beetle.

WE have to acknowledge the receipt of the first three parts of a new publication from the Museum für Natur- und Heimatkunde zu Magdeburg, edited by Prof. A. Mertens, the director of the museum. By far the most important item in these *Abhandlungen und Berichte* is a paper by the editor on the urus, or aurochs (*Bos primigenius*), which occupies the whole of part ii. The author gives a review and digest of the whole of the early literature and documents relating to the ancient wild ox of Europe, as well as of the comments upon them by previous writers. In his opinion, there is no doubt that the name aurochs properly belongs to this animal, although it has often been misapplied to the bison. It is likewise certain that in the time of Herberstein (the middle of the sixteenth century) both aurochs and bison were living in Poland, and that they were seen alive by him. According to other testimony, there was living in the Jaktorowka (or Wiskitki) forest, of the Masovia district of Poland, in the

year 1564, a herd of thirty aurochs. By 1599 the number was reduced to twenty-four, while in 1602 only four remained, these being reduced in 1620 to a single cow, which appears to have been alive seven years later. It seems, however, that a few half-domesticated individuals were living in captivity in 1627. Herberstein's testimony that the aurochs was typically a black (or at all events a very dark-coloured) animal with a light dorsal streak is accepted. Other evidence tends, however, to show that there was a grey variety or phase in Poland, and a red one in central Germany, while the partially domesticated individuals kept in confinement during the early part of the seventeenth century may have developed other colour phases, with partial albinism. Several particulars with regard to the breeding and general habits of the aurochs are also given.

In a fifth instalment of his "Studies of Mexican and Central American Plants," published as vol. x., part iii.,



Calibanus caespitosus (Scheidw.) Rose.

of the Contributions from the United States National Herbarium, Dr. J. N. Rose describes a large number of new species. The author being greatly interested in cacti, made them the subject of special investigation during his trip in 1905, and has identified several new and interesting specimens that are described and illustrated. In some cases numerous individuals cluster together to form a large cushion, as *Echinocactus robustus*; others develop into strange arboreal structures producing hundreds of nearly erect branches, notably *Cereus Webberi*, while *Echinocactus ingens* produces a large circular body that is cut up into sections resembling Dutch cheeses and boiled with sugar to make candy. Even more curious is the liliaceous plant shown in the illustration here reproduced, that is characterised by its thick corky exterior, and lives upon the food absorbed through a few fibrous roots; it forms the type of a new genus, named after Shakespeare's Caliban, *Calibanus caespitosus*.

In the Journal of the Royal Microscopical Society for December, 1906, Dr. Alfred C. Stokes contributes a note on a certain form of butterfly scale the structure of which well illustrates certain points in connection with the much-studied "Podura" scale. He says:—"These special wing-scales are formed of three distinct membranes, of which the upper and the lower bear longitudinal ribs, between which both membranes are distinctly, even conspicuously perforated by minute apertures arranged in rows more or less horizontal." It appears not to be generally known that the "clouded yellow" (*Colias edusa*) possesses pear-shaped wing-scales mixed with the ordinary scales, corresponding more or less closely to Dr. Stokes's description. These special scales seem to take the place of the "plumules" of many Pieridæ and Satyridæ, and of the "battledore" scales of Lycenidæ.

THE growth of the sudd on the Upper Nile, and the blocking of American rivers with plants of the water-fern, Azolla, are well-known examples of the danger arising out of the undue development of certain water weeds. The most recent instance is recorded from Australia, where the water hyacinth, *Pontederia (Eichhornia) crassipes*, characterised by its bladder-like swollen petioles and attractive blue flowers, has, owing to its rapid propagation by means of offsets, become a nuisance in the northern rivers of New South Wales and in Queensland. A report prepared by the order of the Minister for Public Works in New South Wales discusses the origin of the plant, the methods and cost of eradication, and proposes that a Noxious Weeds Bill should be introduced into Parliament.

THE report of the International Committee on Atomic Weights for 1907 is published in the current number (No. 319) of the Proceedings of the Chemical Society. New values are suggested, on the basis of determinations made during the past year, for bismuth, nitrogen, tantalum, and terbium, and the opinion is expressed that alterations are needed in the atomic weights of silver and chlorine. Before, however, recommending any change as regards these elements, the committee deems it advisable to wait for fuller information of the results of determinations known to be in progress, as the new values for silver and chlorine will have an influence on a large number of atomic weights.

In a paper on the relation of chemical activity to electrolytic conductivity, by Mr. John L. Sammis, published in the *Journal of Physical Chemistry* (vol. x., No. 8), a large number of experimental observations are cited as disproving the views of Arrhenius and Ostwald that chemical activity in solution is proportional to the electrolytic conduction. The activity of acids in inverting sugar, catalysing esters, and dissolving magnesium is changed by the addition of benzene to the aqueous solution employed at a rate disproportionate to the conductivity. The replacement of one metal by another is said to take place in molten salts or solutions which are the best of insulators as well as in liquids which are good electrolytes. It was found that in sixty-nine non-conducting solutions of copper oleate prepared with different solvents, copper was easily precipitated by lead, whilst in fourteen other non-conducting solutions lead did not replace copper. The general purpose of the paper is to emphasise the view that the solvent is not indifferent to the solute. It is contended that the facts brought forward are explainable only on the hypothesis that "chemical" union occurs between the solvent and the dissolved substance.

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OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN FEBRUARY:—

- Feb. 8. 16h. Venus at greatest elongation, $46^{\circ} 53' W.$
 „ 19h. Venus in conjunction with the Moon. Venus $0^{\circ} 51' N.$
 9. 10h. Minimum of Algol (β Persei).
 12. 6h. 49m. Minimum of Algol (β Persei).
 15. 20h. Vesta in conjunction with the Moon. Vesta $0^{\circ} 42' S.$
 19. 6h. 31m. to 9h. 33m. Transit of Jupiter's Sat. III. (Ganymede).
 20. 23h. Conjunction of Mercury and Saturn. Mercury $1^{\circ} 40' N.$
 22. 6h. Conjunction of Jupiter with the Moon. Jupiter $2^{\circ} 45' N.$
 „ 16h. 8m. to 16h. 58m. Moon occults γ Geminorum (mag. 4.1).
 23. 7h. 11m. to 8h. 29m. Moon occults ζ Geminorum (variable).
 25. 5h. 30m. to 6h. 31m. Moon occults δ Cancr. (mag. 4.2).
 26. 10h. 12m. to 13h. 14m. Transit of Jupiter's Sat. III. (Ganymede).

MICROMETER MEASURES DURING THE SOLAR ECLIPSE OF AUGUST, 1905.—At the meeting of the Paris Academy of Sciences held on January 7, M. J. Merlin submitted a paper discussing the micrometer measures made at Roquetas (Spain) by MM. André and Guillaume during the total solar eclipse of August, 1905. From this discussion he arrives at the conclusion that the lunar-parallax constant determined by Prof. Newcomb is not affected by any error sufficiently large to be detected by the measurements carried out. There is, however, room to correct the relative positions of the sun and moon as given in the *Connaissance des Temps*, although the correction does not modify the apparent trajectory of the moon in regard to the sun; it serves only to advance the position of the former in that trajectory by an amount corresponding to an advance of 11.1 seconds in the calculated times of the contacts (*Comptes rendus*, January 7).

HEIGHTS OF METEORS OBSERVED IN 1906.—In No. 4152 of the *Astronomische Nachrichten* Mr. Denning gives the heights, lengths of paths, and velocities of ten large meteors observed in England during 1906. The heights at the commencement of visibility varied from fifty-nine to eighty-nine miles, whilst those at disappearance varied from twenty-two to fifty-six miles. Seventy-two miles was the length of the longest path recorded, and twenty-four miles that of the shortest. The velocities determined lie between fifteen and thirty miles per second, the latter value having been determined for a Perseid observed on August 5, 1906.

A QUICKLY CHANGING VARIABLE STAR.—In Bulletin No. 9 of the Laws Observatory, University of Missouri, Mr. F. H. Seares discusses the observations of the quickly changing variable star R.R. Draconis (188.1904) which were made at that observatory during 1905-6. The variable is of the Algol type, with a period of about 2.8 days, and its light-curve is peculiar in being extraordinarily steep about the time of minimum. The latter could not be determined exactly, because the star becomes invisible for about two hours in the $7\frac{1}{4}$ -inch refractor employed, but the observations plainly showed that the range is greater than three magnitudes, and that the rate of change at the time of disappearance is one magnitude in half an hour. The normal magnitude of this object is 9.98, and the elements of its period, as determined from these observations, are:—

Min. = J.D. 2417026.682 + 2.831079d. E. G.M.T.

Some of the residuals suggest the possibility of a variation in the period, but for the present this possibility remains very uncertain.

METCALF'S COMET 1906h.—Another set of elliptic elements for comet 1906h has been calculated by Mr. Crawford from observations made at the Lick Observatory. This gives October 5.66, 1906, as the time of perihelion passage, and 8.23752 years as the period of the comet (Lick Observatory Bulletin, No. 108).